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ARM Facilities Newsletter

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Atmospheric Radiation Measurement Program

www.arm.gov

ARM

Local Students Explore ARM Program Site

Good grades and school attendance have paid off for 45 Tonkawa students in grades 6, 7, and 8. School principal Mike Kirtley arranged a tour for these dedicated students at the ARM Program's SGP central facility near Lamont, Oklahoma, on March 12, 2003.

The Tonkawa students, their teachers, and Kirtley were on hand to observe a weather balloon launch by Marilyn Dowell, SGP site sonde operator. The tour of the facility was guided by deputy site operations manager John Schatz and assistant SGP site scientist Don Bond.

Figure 1. A group of 45 Tonkawa Middle School students toured the SGP central facility on March 12, 2003. The trip was planned by school principal Mike Kirtley as a reward to students with good grades and attendance. (ARM photo)

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The students displayed keen interest in the site's operations and science and posed some excellent questions. Students were shown a vast array of instruments that make basic meteorological measurements and also quantify solar radiation, soil moisture and temperature, energy fluxes between the atmosphere and the ground, cloud cover and vertical structure, vertical profiles of atmospheric winds and temperatures, and atmospheric aerosols.

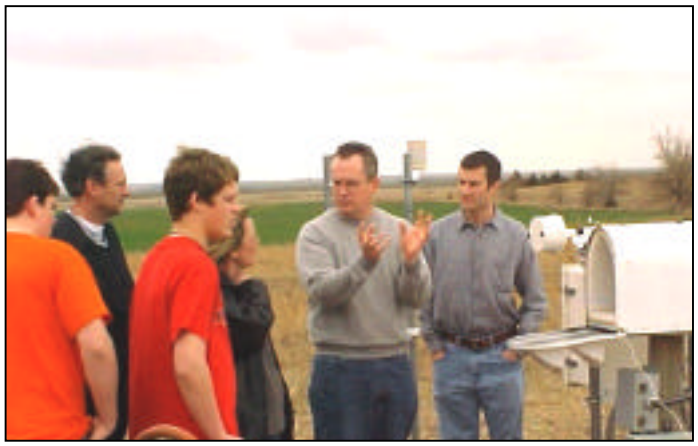

Figure 2. Assistant SGP site scientist Don Bond (right) and deputy site operations manager John Schatz (center) explain the theory of operation of the temperature, humidity, wind, and pressure system (THAWPS) instrument at the SGP central facility near Lamont, Oklahoma. (ARM photo)

The SGP instruments operate continuously to provide an uninterrupted data stream that documents all weather conditions and seasonal changes at the site. The measurements generated, provided at no cost to scientists worldwide, are unprecedented in volume and quality.

For more information about the ARM Program, visit the ARM web site at www.arm.gov. To schedule a tour of the SGP central facility near Lamont, contact John R. Schatz, deputy site operations manager, at 580-388-4053.

Aerosol Intensive Observation Period Scheduled

An intensive observation period (IOP) to explore atmospheric aerosols has been scheduled for the SGP site during May 2003. The Aerosol IOP will focus on atmospheric aerosols, tiny particles not usually visible to the human eye. These aerosols interact with incoming solar radiation and can affect daily weather conditions, as well as long-term climate on Earth.

A main goal of the ARM Program is to improve the understanding of the interaction between clouds and solar radiation, so that their parameterizations and functions can be portrayed more accurately in global climate models. Aerosols play a large role in the way solar radiation travels through the atmosphere. Aerosols can scatter, reflect, and absorb solar radiation, changing the amount of energy that travels all the way through the atmosphere and reaches Earth's surface. Aerosols can also indirectly affect the transfer of solar radiation through the atmosphere through their influence on clouds and cloud properties. In addition, aerosols can act as particles on which cloud droplets form, resulting in increased cloud reflectivity and longer cloud life.

Although ARM deploys instruments capable of measuring some characteristics of atmospheric aerosols at the surface, ARM cannot provide the detail needed to make completely accurate computations of radiative fluxes. The Aerosol IOP is an opportunity

to make more detailed measurements, especially in the vertical column directly above the SGP site's location. A host of guest instruments will be deployed at the central facility especially for the Aerosol IOP. In addition, research aircraft equipped with aerosol and cloud sampling instrumentation will be flown above the site to collect data at different altitudes. Vertical sampling by aircraft yields specific information about the vertical column for climate modeling.

Figure 3. The guest instrument facility at the SGP central facility will host most of the temporarily deployed guest instruments brought to the site for the Aerosol IOP scheduled for May 2003. (ARM photo)

Scientists will examine several scientific hypotheses by performing "closure" experiments. This type of experiment compares measurable quantities with the equivalent calculated values or with measurements made by different means. If the agreement is acceptable, then closure is said to have been achieved. For example, values measured by remote sensing instruments (which measure quantities from afar, as does a satellite or weather radar) can be compared with measurements made *in situ* (within the instrument's surroundings, as with a thermometer, wind vane, or weather balloon).

To produce accurate, valuable results, climate models must contain accurate representations of the influences aerosols exert on solar radiation and radiative fluxes. The goal of the Aerosol IOP is generate data needed to improve those representations.